

P, ENT COOPERATION TREA

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner
 US Department of Commerce
 United States Patent and Trademark
 Office, PCT
 2011 South Clark Place Room
 CP2/5C24
 Arlington, VA 22202
 ETATS-UNIS D'AMERIQUE
 in its capacity as elected Office

Date of mailing (day/month/year) 29 January 2001 (29.01.01)	
International application No. PCT/IL99/00479	Applicant's or agent's file reference 141/01106
International filing date (day/month/year) 05 September 1999 (05.09.99)	Priority date (day/month/year) 19 May 1999 (19.05.99)
Applicant SARIEL, Aviram et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:
 12 December 2000 (12.12.00)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was

☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer Athina Nickitas-Etienne Telephone No.: (41-22) 338.83.38
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PATENT COOPERATION TREATY

RECEIVED

04-09-2001

FENSTER & Co.

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

FENSTER & COMPANY PATENT
ATTORNEYS, LTD
P.O.Box 10256
Petach Tikva 49002
ISRAEL

PCT

NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL PRELIMINARY
EXAMINATION REPORT
(PCT Rule 71.1)Date of mailing
(day/month/year) 28.08.2001Applicant's or agent's file reference
141/01106

IMPORTANT NOTIFICATION

International application No.
PCT/IL99/00479International filing date (day/month/year)
05/09/1999Priority date (day/month/year)
19/05/1999Applicant
LENSLET, LTD. et al.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.


4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA/



European Patent Office
D-80298 Munich
Tel. +49 89 2399 - 0 Tx: 523656 epmu d
Fax: +49 89 2399 - 4465

Authorized officer

Benigar, M

Tel. +49 89 2399-2996



Form PCT/IPEA/416 (July 1992)

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)



Applicant's or agent's file reference 141/01106		FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/1PEA/416)
International application No. PCT/IL99/00479	International filing date (day/month/year) 05/09/1999	Priority date (day/month/year) 19/05/1999	
International Patent Classification (IPC) or national classification and IPC G06T9/00			
Applicant LENSLET, LTD. et al.			

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 10 sheets, including this cover sheet.
- ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 11 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☒ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand 19/12/2000	Date of completion of this report 28.08.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich	Authorized officer Borotschnig, H. 

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/IL99/00479

I. Basis of the report

1. With regard to the elements of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):
Description, pages:

1-39 as originally filed

Claims, No.:

1-102 with telefax of 21/08/2001

Drawings, sheets:

1/13-13/13 as originally filed

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).
3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:
- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/IL99/00479

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):
(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

IV. Lack of unity of invention

1. In response to the invitation to restrict or pay additional fees the applicant has:

- ☐ restricted the claims.
☒ paid additional fees.
☐ paid additional fees under protest.
☐ neither restricted nor paid additional fees.

2. ☐ This Authority found that the requirement of unity of invention is not complied and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is

- ☐ complied with.
☒ not complied with for the following reasons:
see separate sheet

4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:

- ☒ all parts.
☐ the parts relating to claims Nos. .

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-102
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-102
	No:	Claims	

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/IL99/00479

Industrial applicability (IA) Yes: Claims 1-102
 No: Claims

2. Citations and explanations
 see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the International application have been noted:
see separate sheet

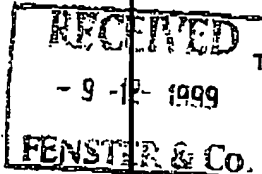
VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

From the INTERNATIONAL SEARCHING AUTHORITY

PCT

To:
FENSTER & COMPANY PATENT
ATTORNEYS, LTD
Attn. FENSTER, P.
P.O. Box 10256
Petach Tikva 49002
ISRAEL



NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL SEARCH REPORT
OR THE DECLARATION

(PCT Rule 44.1)

Date of mailing
(day/month/year) 29/11/1999

Applicant's or agent's file reference
141/01106

FOR FURTHER ACTION See paragraphs 1 and 4 below

International application No.
PCT/IL 99/00479

International filing date
(day/month/year) 05/09/1999

Applicant

LENSLET, LTD. et al.

1. ☒ The applicant is hereby notified that the International Search Report has been established and is transmitted herewith.

Filing of amendments and statement under Article 19:

The applicant is entitled, if he so wishes, to amend the claims of the International Application (see Rule 46):

When? The time limit for filing such amendments is normally 2 months from the date of transmittal of the International Search Report; however, for more details, see the notes on the accompanying sheet.

Where? Directly to the International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland
Facsimile No.: (41-22) 740.1435

For more detailed instructions, see the notes on the accompanying sheet.

2. ☐ The applicant is hereby notified that no International Search Report will be established and that the declaration under Article 17(2)(a) to that effect is transmitted herewith.

3. ☐ With regard to the protest against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.

☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. Further action(s): The applicant is reminded of the following:

Shortly after 18 months from the priority date, the International application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the International application, or of the priority claim, must reach the International Bureau as provided in Rules 90bis.1 and 90bis.3, respectively, before the completion of the technical preparations for International publication.

Within 18 months from the priority date, a demand for International preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until 30 months from the priority date (in some Offices even later).

Within 20 months from the priority date, the applicant must perform the prescribed acts for entry into the national phase before all designated Offices which have not been elected in the demand or in a later election within 18 months from the priority date or could not be elected because they are not bound by Chapter II.

Name and mailing address of the International Searching Authority



European Patent Office, P.B. 5818 Patentlaan 2
NL-2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl
Fax (+31-70) 340-3018

Authorized officer

Ahmed Soliman

NOTES TO FORM PCT/ISA/220

These Notes are intended to give the basic instructions concerning the filing of amendments under Article 19. The Notes are based on the requirements of the Patent Cooperation Treaty, the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and those requirements, the latter are applicable. For more detailed information, see also the PCT Applicant's Guide, a publication of WIPO.

In these Notes, "Article", "Rule", and "Section" refer to the provisions of the PCT, the PCT Regulations and the PCT Administrative Instructions respectively.

INSTRUCTIONS CONCERNING AMENDMENTS UNDER ARTICLE 19

The applicant has, after having received the international search report, one opportunity to amend the claims of the international application. It should however be emphasized that, since all parts of the international application (claims, description and drawings) may be amended during the international preliminary examination procedure, there is usually no need to file amendments of the claims under Article 19 except where, e.g. the applicant wants the latter to be published for the purposes of provisional protection or has another reason for amending the claims before international publication. Furthermore, it should be emphasized that provisional protection is available in some States only.

What parts of the international application may be amended?

Under Article 19, only the claims may be amended.

During the international phase, the claims may also be amended (or further amended) under Article 34 before the International Preliminary Examining Authority. The description and drawings may only be amended under Article 34 before the International Examining Authority.

Upon entry into the national phase, all parts of the international application may be amended under Article 28 or, where applicable, Article 41.

When?

Within 2 months from the date of transmittal of the international search report or 15 months from the priority date, whichever time limit expires later. It should be noted, however, that the amendments will be considered as having been received on time if they are received by the International Bureau after the expiration of the applicable time limit but before the completion of the technical preparations for international publication (Rule 46.1).

Where not to file the amendments?

The amendments may only be filed with the International Bureau and not with the receiving Office or the International Searching Authority (Rule 46.2).

Where a demand for international preliminary examination has been/is filed, see below.

How?

Either by cancelling one or more entire claims, by adding one or more new claims or by amending the text of one or more of the claims as filed.

A replacement sheet must be submitted for each sheet of the claims which, on account of an amendment or amendments, differs from the sheet originally filed.

All the claims appearing on a replacement sheet must be numbered in Arabic numerals. Where a claim is cancelled, no renumbering of the other claims is required. In all cases where claims are renumbered, they must be renumbered consecutively (Administrative Instructions, Section 205(b)).

The amendments must be made in the language in which the international application is to be published.

What documents must/may accompany the amendments?**Letter (Section 205(b)):**

The amendments must be submitted with a letter.

The letter will not be published with the international application and the amended claims. It should not be confused with the "Statement under Article 19(1)" (see below, under "Statement under Article 19(1)").

The letter must be in English or French, at the choice of the applicant. However, if the language of the international application is English, the letter must be in English; if the language of the international application is French, the letter must be in French.

NOTES TO FORM PCT/ISA/220 (continued)

The letter must indicate the differences between the claims as filed and the claims as amended. It must, in particular, indicate, in connection with each claim appearing in the international application (it being understood that identical indications concerning several claims may be grouped), whether

- (i) the claim is unchanged;
- (ii) the claim is cancelled;
- (iii) the claim is new;
- (iv) the claim replaces one or more claims as filed;
- (v) the claim is the result of the division of a claim as filed.

The following examples illustrate the manner in which amendments must be explained in the accompanying letter:

1. [Where originally there were 48 claims and after amendment of some claims there are 51]:
"Claims 1 to 29, 31, 32, 34, 35, 37 to 48 replaced by amended claims bearing the same numbers; claims 30, 33 and 36 unchanged; new claims 49 to 51 added."
2. [Where originally there were 15 claims and after amendment of all claims there are 11]:
"Claims 1 to 15 replaced by amended claims 1 to 11."
3. [Where originally there were 14 claims and the amendments consist in cancelling some claims and in adding new claims]:
"Claims 1 to 6 and 14 unchanged; claims 7 to 13 cancelled; new claims 15, 16 and 17 added." or
"Claims 7 to 13 cancelled; new claims 15, 16 and 17 added; all other claims unchanged."
4. [Where various kinds of amendments are made]:
"Claims 1-10 unchanged; claims 11 to 13, 18 and 19 cancelled; claims 14, 15 and 16 replaced by amended claim 14; claim 17 subdivided into amended claims 15, 16 and 17; new claims 20 and 21 added."

"Statement under article 19(1)" (Rule 46.4)

The amendments may be accompanied by a statement explaining the amendments and indicating any impact that such amendments might have on the description and the drawings (which cannot be amended under Article 19(1)).

The statement will be published with the international application and the amended claims.

It must be in the language in which the international application is to be published.

It must be brief, not exceeding 500 words if in English or if translated into English.

It should not be confused with and does not replace the letter indicating the differences between the claims as filed and as amended. It must be filed on a separate sheet and must be identified as such by a heading, preferably by using the words "Statement under Article 19(1)."

It may not contain any disparaging comments on the international search report or the relevance of citations contained in that report. Reference to citations, relevant to a given claim, contained in the international search report may be made only in connection with an amendment of that claim.

Consequence if a demand for international preliminary examination has already been filed

If, at the time of filing any amendments under Article 19, a demand for international preliminary examination has already been submitted, the applicant must preferably, at the same time of filing the amendments with the International Bureau, also file a copy of such amendments with the International Preliminary Examining Authority (see Rule 62.2(a), first sentence).

Consequence with regard to translation of the international application for entry into the national phase

The applicant's attention is drawn to the fact that, where upon entry into the national phase, a translation of the claims as amended under Article 19 may have to be furnished to the designated/elected Offices, instead of, or in addition to, the translation of the claims as filed.

For further details on the requirements of each designated/elected Office, see Volume II of the PCT Applicant's Guide.

09/926547
JC1 [redacted] d PCT/PTO 19 NOV 2001**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/IL99/00479

Re Item IV**Lack of unity of invention**

1 Reference is made to the following documents:

- D.I.1: WONG K W ET AL: 'OPTICAL COSINE TRANSFORM USING MICROLENS ARRAY AND PHASE CONJUGATE MIRROR', JPN. J. APPL. PHYS. VOL: 34(1992), pp. 1672-1676
- D1: EP-A-0 577 258 (SHARP KK) 5 January 1994 (1994-01-05)
- D3: AKITOSHI YOSHIDA ET AL: 'OPTICAL COMPUTING TECHNIQUES FOR IMAGE/VIDEO COMPRESSION' PROCEEDINGS OF THE IEEE, US, IEEE. NEW YORK, vol. 82, no. 6, page 948-954 XP000438344 ISSN: 0018-9219

2 The application lacks unity. The following two groups of claims are not so linked as to form a single general inventive concept:

- (1) Claims 1-85, 90-102: directed to: a method and apparatus to optically apply a discrete linear transform to discrete spaced apart input data by using a continuous optical Fourier transforming component and properly sampling the output (1-85) and to a single integrated multi-block transform optical element comprising optical groups that transform different data-blocks, the data being arranged as a spatially impulse image (90-102).
- (2) Claims 86-89: directed to a method of optical motion estimation comprising using an optical component to perform an optical DCT transform.

3 The above grouping of claims follows from:

- (i) Groups (1)-(2) define inventions (cf. Item V).
- (ii) different independent claims within a group are linked by a common inventive concept, but the inventive concepts of the different groups are different: Group 1: independent claims 1 and 39 define corresponding method and apparatus claim. The common inventive concept of claims 1, 39 and 90 is the idea of increasing accuracy in a discrete optical transform by

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/IL99/00479

changing the way the input is presented. Group 2 contains only one independent claim 86. The concept of group 1 is not related to the concept of implementing a DCT based motion estimation using optics (claim 86).

Re Item V**Reasoned statement under Art. 35 with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

- 4 As to **claim 1**, document D.I.1 - which is considered to be the closest prior art document - discloses a method of data processing, comprising: providing image-data encoding light as a spaced apart discrete input set with dead spaces between input set elements (cf. D.I.1 abstract, eq. (7) and preceding paragraph, Fig. 2: pixels of SLM define discrete data even though the single pixels have a certain spatial extent. There is a discrete number of pixels, each pixel acting as a discrete display for a single data element. The SLM in Fig. 2 shows spaces between the rows of pixels belonging to different blocks), transforming said light from an image space to a transform space utilizing a continuous optical Fourier transforming component to apply a discrete linear transform to said input discrete data set (cf. D.I.1, Figs. 1-3, pg. 1672 right col., pp. 1672 sections 3-5), which transform generates coefficients that inter-relate a plurality of input set elements (ibid. trivial for DCT), and detecting data carried by said transformed light as discrete data, by a spatially discrete sampler which detects spaced apart samples (ibid., in particular section 5.2: discrete CCD pixels are used to detect the data needed to get the DCT of eqs. (1). In order to avoid interference between different blocks the pixels used to detect different blocks are spaced apart, cf. Fig. 3).
- 4.1 D.I.1 fails to disclose having dead space between all input set elements.
- 4.2 The technical effect of this feature is a (potential) increase in accuracy via a special sampling of the discrete data elements.
- 4.3 The technical problem is thus how to increase the accuracy of D.I.1
- 4.4 The major problems concerning accuracy in D.I.1 are mentioned in sections 5 and 6 of the document. The skilled person would thus try to improve the system along

INTERNATIONAL PRELIMINARY

International application No. PCT/IL99/00479

EXAMINATION REPORT - SEPARATE SHEET

the lines given there. No hint can thus be found that processing power should be enhanced by changing the way the input is presented, nor that it would be particularly advantageous to put dead spaces between **all** the input elements (e.g. by not using all pixels or using spaced apart apertures, masks etc). Further, note that in D.I.1 the gaps between blocks are used to avoid crosstalk between different processing channels. However, interaction between single elements within one channel is **desired** for the transform of one block. The principles underlying the gaps in D.I.1 are thus not identical to the applicant's accuracy considerations which motivate the dead spaces between **all** the input elements.

- 4.5 The subject matter of **claim 1** thus appears to be new and inventive.
- 4.6 As to **claims 2-38**, they define further details of claim 1 and thus also fulfill the requirements of Art. 33 PCT.
- 5 The same considerations apply to the corresponding apparatus **claims 39-85**.
- 6 **Claims 86-89** define an optical motion estimation system.
- 6.1 As to **claim 86**, the closest prior art is discussed on pg. 29 of the application, disclosing a method of optical motion estimation, comprising providing a first image block, DCT transforming said first block, providing a second image block, DCT transforming said second image block, and processing said first and second DCT transformed data sets to determine an amount of relative motion of said two blocks, wherein said DCT transforming component serve as a part of a transform compression system (ibid., in fact, one advantage of the described prior art approach lies in the fact that the DCT transform does not have to be done separately for transform compression and motion estimation).
- 6.1.1 The cited prior art fails to disclose that the DCT transforming is done on light waves by an optical component.
- 6.1.2 The technical problem may thus be seen as providing a different implementation for the cited algorithm, the standard implementation being based on electronic digital signal processors.

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/IL99/00479

- 6.1.3 The question to be answered is thus: would the skilled person knowing the cited prior art algorithm consider the alternative of optical computing instead of using the standard electronic DSPs ?
- 6.1.4 In general, the mere idea of using various possible hardware solutions for a given algorithm certainly cannot be considered as involving an inventive step. However, in the case at hand the following arguments would actually keep a skilled person from considering an *optical* implementation:
- (a) none of the optical DCT processors discussed in the available prior art appears to be able to compete with electronic DSPs in terms of accuracy or speed (cf. e.g. the errors listed in D.I.1, section 6 or the parameters in D1 table 1). Furthermore, it is clear that an optical DCT processor may have to exchange results with electronic computing. This induces displaying, sensing and communication overheads, which may spoil the speed advantages of the parallel optical transform.
 - (b) DCT based algorithms for motion-estimation do not appear to be especially suited for optical implementation as performing continuous optical Fourier transforms is much easier than discrete transforms. For example, D3, section IV uses standard optical correlation in the continuous Fourier domain for motion estimation because this can be implemented more easily and leads to usable results. (NB: this would also be an argument why a skilled person starting from the system of e.g. D3 would not consider implementing a DCT for motion estimation).
- 6.2 Thus the subject matter of **claim 86** appears to fulfill the requirements of Art. 33 PCT. The same is true for dependent **claims 87-89** which define further details.
- 7 As to **claim 90**, D.I.1 is considered as the closed prior art and discloses a single integrated multi-block-transform optical element, comprising a plurality of optical groups, each group comprising at least one optical sub-element, wherein each of said optical groups optically transforms a block of data using a signed linear discrete transform, wherein said block is part of a data set divided into blocks for block-transforming, including at least one other block being transformed in parallel

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/IL99/00479

- by another optical group of said integrated element (cf. D.I.1 abstract, Figs. 1-3, integration of the element is implicit or trivial as it only amounts to put a casing around the system and considering the resulting whole "black-box"-setup as "a single element").
- 7.1 D.I.1 fails to disclose that the data to be transformed is arranged as a *spatially impulse image* (Note: this term is here understood to imply *spaced apart impulses with dead spaces in-between*. Otherwise the SLMs of D.I.1 could also be regarded as providing "impulses" of pixel-size).
- 7.2 The technical effect of this feature is an increase in accuracy and it cannot be convincingly argued that the skilled person would consider such an impulse image in order to increase accuracy (cf. again the discussion of claims 1-85).
- 7.3 Hence the subject matter of claim 90 and its dependent claims 91-102 is considered as involving an inventive step.

Re Item VII+VIII**Certain defects in the international application****Certain observations on the international application**

- 8 The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).
- 9 The formulation "...the disclosures of which are incorporated herein by reference" (used at pages 2, 14, 24, 25, 29, 33, 35 and 36) is inapt because the conditions for complete integration of the cited texts - as specified in the PCT Guidelines II-4.17 - are not met.
- 10 The formulation employed on pg. 33 lines 31-33 extends the scope of applicability of preferred embodiments "even to other applications than those covered by the present invention". This formulation renders the extent of protection vague and undefined (cf. PCT GL III-4.3a). A clear statement can already be found at pg. 34, lines 21-22. Further, the general statements made on pg. 39, lines 14-18 also imply that the extent of protection can be expanded beyond the scope of the

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/IL99/00479

claims in some vague and not precisely defined manner (PCT GL III-4.3a).

- 11 Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in document D.I.1 is not mentioned in the description, nor is the document identified therein.
- 12 The claims are not in the two-part form (Rule 6.3 PCT). Neither is there a clear indication in the description which features of the subject-matter of the independent claims are already known from document D.I.1; see the PCT Guidelines, III-2.3a.
- 13 The introductory part of the description (particularly the section "Summary of the Invention") is not in accordance with the claimed subject matter.

Express Mail Label No.

Page 1 of 5

Docket No.
141/02497

Declaration and Power of Attorney For Patent Application

English Language Declaration

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole Inventor (if only one name is listed below) or an original, first and joint Inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

IMAGE COMPRESSION

the specification of which
(check one)

☐ is attached hereto.

☒ was filed on September 5, 1999 as United States Application No. or PCT International Application Number PCT/IL99/00479

and was amended ☒ as in the annexes to the International Preliminary Examination Report
(if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d) or Section 365(b) of any foreign application(s) for patent or inventor's certificate, or Section 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate or PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)

Priority Not Claimed

<input checked="" type="checkbox"/> 130038	<u>Israel</u>	<u>19 May 1999</u>	<input type="checkbox"/>
(Number)	(Country)	(Day/Month/Year Filed)	
<input checked="" type="checkbox"/> 131094	<u>Israel</u>	<u>25 July 1999</u>	<input type="checkbox"/>
(Number)	(Country)	(Day/Month/Year Filed)	
			<input type="checkbox"/>
(Number)	(Country)	(Day/Month/Year Filed)	

I hereby claim the benefit under 35 U.S.C. Section 119(e) of any United States provisional application(s) listed below:

_____ (Application Serial No.)	_____ (Filing Date)
_____ (Application Serial No.)	_____ (Filing Date)
_____ (Application Serial No.)	_____ (Filing Date)

I hereby claim the benefit under 35 U. S. C. Section 120 of any United States application(s), or Section 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. Section 112, I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, C. F. R., Section 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application:

_____ (Application Serial No.)	_____ (Filing Date)	_____ (Status) (patented, pending, abandoned)
_____ (Application Serial No.)	_____ (Filing Date)	_____ (Status) (patented, pending, abandoned)
_____ (Application Serial No.)	_____ (Filing Date)	_____ (Status) (patented, pending, abandoned)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

7
POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (list name and registration number)

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Full name of twelfth inventor, if

Twelfth inventor's signature

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Residence

Citizenship

Post Office Address

Full name of thirteenth inventor, if

Thirteenth inventor's signature

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Residence

Citizenship

Post Office Address

Full name of fourteenth inventor, if

Fourteenth inventor's signature

Date

Residence

Citizenship

Post Office Address

09/926547

531 Rec'd PCT/PTC 19 NOV 2001

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
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(10) International Publication Number
WO 00/72267 A1(51) International Patent Classification⁷: G06T 9/00,
G06E 3/00, H04N 7/30, G06T 7/20

(21) International Application Number: PCT/IL99/00479

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5 September 1999 (05.09.1999)

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(30) Priority Data:
130038 19 May 1999 (19.05.1999) IL
131094 25 July 1999 (25.07.1999) IL(71) Applicant (for all designated States except US):
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(72) Inventors; and

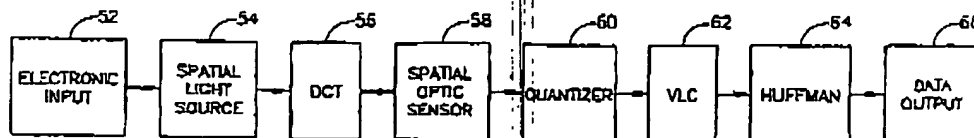
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Tikva (IL).(81) Designated States (national): AE, AL, AM, AT, AU, AZ,
BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK,
DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL,
IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU,
LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO,
RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG,
US, UZ, VN, YU, ZA, ZW.(84) Designated States (regional): ARIPO patent (GH, GM,
KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM,
AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT,
BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC,
NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA,
GN, GW, ML, MR, NE, SN, TD, TG).

Published:

With international search report.

For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.

(54) Title: IMAGE COMPRESSION



50

(57) Abstract: A method of image compression, comprising: providing image data encoding light; transforming said light from an image space to a transform space utilizing an optical component; and converting said transformed light into electrical signals, which electrical signals represent a compressed representation of said image data.

WO 00/72267 A1

PATENT COOPERATION TREATY

PCT

NOTICE INFORMING THE APPLICANT OF THE
COMMUNICATION OF THE INTERNATIONAL
APPLICATION TO THE DESIGNATED OFFICES

(PCT Rule 47.1(c), first sentence)

From the INTERNATIONAL BUREAU

To:
FENSTER, Paul
Fenster & Company Patent
Attorneys, Ltd.
P.O. Box 10256
49002 Petach Tikva
ISRAEL

RECEIVED

12-12-2000

FENSTER & Co.

Date of mailing (day/month/year)
30 November 2000 (30.11.00)

Applicant's or agent's file reference
141/01106

IMPORTANT NOTICE

International application No.
PCT/IL99/00479

International filing date (day/month/year)
05 September 1999 (05.09.99)

Priority date (day/month/year)
19 May 1999 (19.05.99)

Applicant
LENSLET, LTD. et al

1. Notice is hereby given that the International Bureau has communicated, as provided in Article 20, the international application to the following designated Offices on the date indicated above as the date of mailing of this Notice:

AU, KP, KR, US



In accordance with Rule 47.1(c), third sentence, those Offices will accept the present Notice as conclusive evidence that the communication of the international application has duly taken place on the date of mailing indicated above and no copy of the international application is required to be furnished by the applicant to the designated Office(s).

2. The following designated Offices have waived the requirement for such a communication at this time:

AE, AL, AM, AP, AT, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EA, EE, EP, ES, FI, GB, GD,
GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO,
NZ, OA, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZA, ZW

The communication will be made to those Offices only upon their request. Furthermore, those Offices do not require the applicant to furnish a copy of the international application (Rule 49.1(a-bis)).

3. Enclosed with this Notice is a copy of the international application as published by the International Bureau on 30 November 2000 (30.11.00) under No. WO 00/2267.

REMINDER REGARDING CHAPTER II (Article 31(2)(a) and Rule 54.2)

If the applicant wishes to postpone entry into the national phase until 30 months (or later in some Offices) from the priority date, a demand for international preliminary examination must be filed with the competent International Preliminary Examining Authority before the expiration of 18 months from the priority date.

It is the applicant's sole responsibility to monitor the 18-month time limit.

Note that only an applicant who is a national or resident of a PCT Contracting State which is bound by Chapter II has the right to file a demand for international preliminary examination.

REMINDER REGARDING ENTRY INTO THE NATIONAL PHASE (Article 22 or 39(1))

If the applicant wishes to proceed with the international application in the national phase, he must, within 20 months or 30 months, or later in some Offices, perform the acts referred to therein before each designated or elected Office.

For further important information on the time limits and acts to be performed for entering the national phase, see the Annex to Form PCT/IB/301 (Notification of Receipt of Record Copy) and Volume II of the PCT Applicant's Guide.

The International Bureau of WIPO
30, chemin des Colombettes

Authorized officer

(1.74174)

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 141/01106	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, Item 5 below.	
International application No. PCT/IL 99/ 00479	International filing date (day/month/year) 05/09/1999	(Earliest) Priority Date (day/month/year) 19/05/1999
Applicant LENSLET, LTD. et al.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the language, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).
- b. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international search was carried out on the basis of the sequence listing:
- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

2. ☐ Certain claims were found unsearchable (See Box I).

3. ☐ Unity of invention is lacking (see Box II).

4. With regard to the title,

- ☒ the text is approved as submitted by the applicant.
- ☐ the text has been established by this Authority to read as follows:

6. With regard to the abstract,

- ☒ the text is approved as submitted by the applicant.
- ☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the drawings to be published with the abstract is Figure No.

- ☐ as suggested by the applicant.
- ☒ because the applicant failed to suggest a figure.
- ☐ because this figure better characterizes the invention.
- 2
☐ None of the figures.

Form PCT/ISA/210 (first sheet) (July 1996)

PC 99/00479

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 G06T9/00 G06E3/00 H04N7/30 G06T7/20

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G06T G06E

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	AKITOSHI YOSHIDA ET AL: "OPTICAL COMPUTING TECHNIQUES FOR IMAGE/VIDEO COMPRESSION" PROCEEDINGS OF THE IEEE, US, IEEE. NEW YORK, vol. 82, no. 6, page 948-954 XP000436344 ISSN: 0018-9219 the whole document	1-115
A	US 5 454 047 A (CHANG DAVID B ET AL) 26 September 1995 (1995-09-26) abstract	1-115
	-/-	

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"Z" document member of the same patent family

Date of the actual completion of the international search

22 November 1999

Date of mailing of the international search report

29/11/1999

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INTERNATIONAL SEARCH REPORT

International Application No.

PCT/IL 99/00479

C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GOURLAY J ET AL: "HADAMARD TRANSFORM IMAGE PROCESSING AND ITS OPTICAL IMPLEMENTATION WITH FERROELECTRIC LIQUID CRYSTAL SPATIAL LIGHT MODULATORS" INTERNATIONAL JOURNAL OF OPTOELECTRONICS (INCL. OPTICAL COMPUTING & PROCESSING), GB, TAYLOR & FRANCIS, LONDON, vol. 10, no. 1, page 51-58 XP000582638 ISSN: 0952-5432 paragraphs '0001!', '0005!'	1-115
A	EP 0 577 258 A (SHARP KK) 5 January 1994 (1994-01-05) abstract	1-115

Form PCT/ISA/210 (continuation of second sheet) (July 1982)

page 2 of 2

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/IL 99/00479

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5454047	A	26-09-1995	NONE	
EP 0577258	A	05-01-1994	JP 2774738 B	09-07-1998
			JP 5333398 A	17-12-1993
			DE 69325619 D	19-08-1999
			US 5537492 A	16-07-1996

Form PCT/ISA210 (patent family annex) (July 1992)

INTERNATIONAL SEARCH REPORT

International Application No
PCT/9/00479

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G06T9/00 G06E3/00 H04N7/30 G06T7/20

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 G06T G06E

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

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- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

Date of the actual completion of the international search

22 November 1999

Date of mailing of the international search report

29/11/1999

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/9/00479

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>GOURLAY J ET AL: "HADAMARD TRANSFORM IMAGE PROCESSING AND ITS OPTICAL IMPLEMENTATION WITH FERROELECTRIC LIQUID CRYSTAL SPATIAL LIGHT MODULATORS" INTERNATIONAL JOURNAL OF OPTOELECTRONICS (INCL.OPTICAL COMPUTING & PROCESSING),GB,TAYLOR & FRANCIS, LONDON, vol. 10, no. 1, page 51-58 XP000582638 ISSN: 0952-5432 paragraphs '0001!,'0005! -----</p>	1-115
A	<p>EP 0 577 258 A (SHARP KK) 5 January 1994 (1994-01-05) abstract -----</p>	1-115

INTERNATIONAL SEARCH REPORT

...ormat patent family members

Internat Application No

PCT 99/00479

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
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EP 0577258	A	05-01-1994	JP 2774738 B	09-07-1998
			JP 5333398 A	17-12-1993
			DE 69325619 D	19-08-1999
			US 5537492 A	16-07-1996

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 141/01106	FOR FURTHER ACTION		see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.
International application No. PCT/IL 99/ 00479	International filing date (day/month/year) 05/09/1999	(Earliest) Priority Date (day/month/year) 19/05/1999	
Applicant LENSLET, LTD. et al.			

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☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

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4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

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5. With regard to the **abstract**,

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6. The figure of the **drawings** to be published with the abstract is Figure No.

2

☐ as suggested by the applicant.

☐ None of the figures.

☒ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/IL 99/00479

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 G06T9/00 G06L3/00 H04N7/30 G06T7/20

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G06T G06E

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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A	US 5 454 047 A (CHANG DAVID B ET AL) 26 September 1995 (1995-09-26) abstract	1-115



Further documents are listed in the continuation of box C.



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* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

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Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/IL 99/00479

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Information on patent family members

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